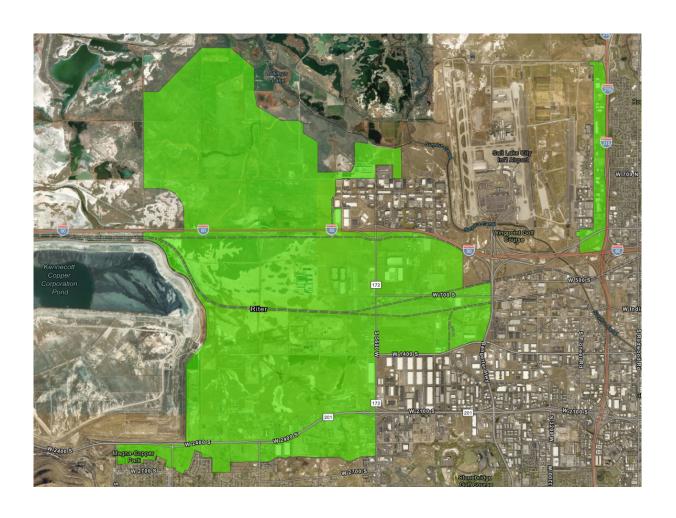


Utah Inland Port Storm Water Sampling and Analysis Plan



Revised January 27, 2021

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UIP

USGS

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Acronyms and Abbreviations

Utah Inland Port

United States Geological Survey

DEQ Department of Environmental Quality DPM Designated Project Manager DQO Data Quality Objective DWQ Utah Division of Water Quality United States Environmental Protection Agency **EPA FPM** Field Project Manager **PARCC** Precision Accuracy Representativeness Comparability and Completeness QA Quality Assurance Quality Analysis Project Plan QAPP QC **Quality Control** Sampling Analysis Plan SAP Standard Operating Procedure SOP **TMDL** Total Maximum Daily Load

Introduction

This Sampling and Analysis Plan (SAP) was prepared by the Utah Department of Environmental Quality (UDEQ), Division of Water Quality (DWQ) for the collection of storm water samples required to establish baseline water quality conditions associated with the Utah Inland Port (UIP) and quantify any impacts to water quality associated with it. The information obtained from the implementation of this SAP will be used by DWQ staff and researchers to determine the effects of the UIP on storm water quality before, during and following development. Data characterizing current water quality conditions will be used to compare against data collected during and after the development of the UIP. This is to determine the effects of the project on water quality and help direct the implementation of best management practices and mitigation measures to protect and improve water quality.

Background

Water quality concerns along the southern shore of the Great Salt Lake in the vicinity of the UIP include mercury, selenium, excess nutrients, and trash/debris (DWQ 2014). In high concentrations mercury and selenium can harm wildlife populations, especially birds, through direct toxicity and cause congenital disabilities. Nutrients in excess concentrations can result in harmful algal blooms including toxic cyanobacteria. Trash and debris can directly affect wildlife and affect water management structures located throughout the wetlands by clogging inlets and outlets.

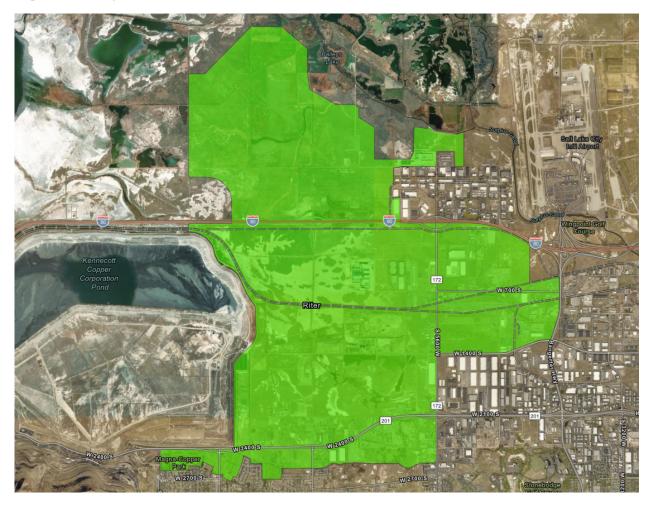
DWQ developed this SAP to evaluate the effects of the UIP on the water quality of surface waters from the site and identify appropriate management measures to mitigate any effects. Specifically, this plan will focus on the change in specific water quality parameters associated with storm water. Storm water runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants such as trash, chemicals, oils, nutrients, heavy metals, pesticides, fertilizers, herbicides, and dirt/sediment. Storm water can also be contaminated by sanitary sewer overflows and cross connections. Monitoring of storm water is appropriate for determining the effects of development since it is directly related to changes in land use and the generation of pollutants listed above that is commonly associated with development.

This SAP defines the data quality objectives, sampling and analytical procedures, safety considerations, documentation and reporting requirements to be implemented by the DWQ for the collection of environmental samples.

Site Description

The UIP is generally located to the west of the Salt Lake International Airport, east of the Kennecott Tailings Pond, and north of the Riter Canal (2550 South), tributary to the Surplus Canal (Figure 1). A separate part of the UIP lies along the west side of Interstate 215 from the junction with Interstate-80 to 2100 North in Salt Lake City. This area is already largely developed and significantly smaller storm water monitoring efforts will be on the portion that lies west of the airport. This area contains two perennial flowing water bodies, Kersey/Lee Creek on the west side of the project area and the Surplus Canal along the east and north.

Figure 1. Study Area of Utah Inland Port



Summary of Project Tasks and Schedule

The tasks associated with this study of the UIP are as follows and shown in Table 1. Project Timeline.

- 1. Implement SAP (spring 2021-fall 2025)
- 2. Validate field and laboratory results (fall 2021/winter 2025)
- 3. Analyze data and publish findings (fall 2021/winter 2025)

Table 1. Project Timeline

Task	2021			2022, 2023, 2024		2025								
		Months												
	06	07	09	10	04	05	09	10	04	05	09	10	11	12
Sample collection (grab and/or composite)	X	X	X	X	X	X	X	X	X	X	X	X		
Data Validation				X				X				X		
Data Analysis				X				X				X	X	
Report Writing													X	X
Final Review														X

Objectives and Design of the Study

The United States Environmental Protection Agency's (EPA's) seven-step data quality objective (DQO) process (EPA, 2006) is used to guide the rationale for the Utah Inland Port SAP. The DQO process defines the type, quantity, and quality of data and establishes performance and acceptance criteria to make sure that the collected data supports the goals of the study.

Specific Objectives of the Study

The specific objective of this study is to collect water quality data in order to characterize the condition of storm water quality associated with the UIP prior to, during and following the development. This is to help identify and prioritize water quality protection and improvement efforts. Project-level data quality objectives (DQOs) for this study are to collect data of the appropriate type, quality, and quantity to test and improve upon current sampling methods. Thus, this SAP will support the assessment of environmental impacts and mitigation measures associated with the UIP, including:

- Characterize the current quality of storm water within the UIP area;
- Track changes in storm water quality during the course of development;
- Use storm water quality data to evaluate best management practice effectiveness and provide information on need for additional measures and/or mitigation.

DQOs are qualitative and quantitative statements derived from systematic planning that clarify the study objective(s), determine the most appropriate type of data to collect, determine the most appropriate conditions from which to collect the data, and specify the level of uncertainty allowed in the collected monitoring data while still meeting the project objectives (EPA, 2006). This information is summarized in Table 2.

Table 2. Data Quality Objectives.

Step	DQOs for Utah Inland Port Storm Water Assessment
1. Problem Statement	Development of the UIP is expected to intensify land uses within its project boundaries including large scale commercial facilities engaged in warehousing and shipping goods. To ensure that appropriate measures are implemented to mitigate development impacts on the sensitive wetland environment along the Great Salt Lake, a long term (5 year) monitoring program is proposed to assess current and future water quality conditions of storm water originating from the UIP area. This baseline information will be compared to future water quality conditions as development progresses to identify the effectiveness of best management practices designed to protect water quality as well as identify any potential impacts and appropriate mitigation measures required to offset those impacts.
2. Goal of Study / Decision Statements	Key Question[s] 1. What are the current water quality conditions of storm water in the UIP area and how does it change over time as development occurs? What trends do the water quality parameters indicate? 2. Are there correlations among the water quality parameters and stages of UIP development? If so, how do these correlations relate to on the ground activities such as land clearing, road and building construction? 3. How can correlations between land use activity and storm water quality help identify and locate appropriate best management practices and / or mitigation measures? Potential Outcomes 1. Information is adequate to characterize the water quality of storm water over time as land use intensifies from agricultural to industrial and commercial uses. 2. If information is not adequate to characterize the condition of storm water DWQ will evaluate results and provide further recommendations on how to improve the data collection process in 2022.
3. Inputs to Decision	The following information will be collected: Field sampling will be conducted with grab samples, portable samplers and multi-parameter data sondes on a continual basis for four months of each year when precipitation is more consistent (April-May and September-October) at 6 sites. . Water chemistry analytes: Total Dissolved Solids, Total Suspended Solids, Volatile and Semi-Volatile Organic Compounds, Total metals, and Total Petroleum Hydrocarbons. Storm water sampling will be conducted at representative locations. Due to the episodic nature of storm water flows, deployment of portable samplers will be required.
4. Study Boundaries	The study area for this project is shown in Figure 1. Practical Constraints on Data Collection 1. Permission for sonde/sampler deployments will need to be obtained from landowners. 2. Staff and funding availability will need to be provided. 3. Availability of field equipment, as well as equipment functionality, may limit some activities. 4. Weather is a significant constraint for all sampling and monitoring activities. This is because storms can limit the ability to safely conduct sampling and measurement activities in the study area.

Step	DQOs for Utah Inland Port Storm Water Assessment
	5. The presence of ice and/or lack of water could limit the ability to collect samples.
5. Decision Rules	The data collected under the scope of this SAP will support the goals of the study. They will guide the DWQ on how to decide whether the available data is sufficient to characterize changes in storm water quality associated with the UIP, assess the effectiveness of best management practices used, and determine appropriate measures to mitigate any negative effects. If information is not adequate the DWQ will evaluate results and provide recommendations for the 2022 SAP.
6. Acceptance Criteria	 Precision—field replicates will be collected for all water chemistry parameters at least once per each site per monitoring season. Accuracy—special efforts will be made to minimize contamination of water chemistry samples through proper collection of field samples, monitoring of sampling bottle blanks, and the use of appropriate laboratories for analysis. Representativeness—the sampling locations have been selected based on a review of aerial photos. The sites were chosen due to their accessibility and setting along major drainages within the UIP. Sites were chosen to encompass potentially unique characteristics of different conditions, such as water sources and potential pollutant inputs. Field sampling will occur following appropriate sample collection procedures as described in SOPs for each method. Site photos and field notes will be collected at each site and can be used to describe any unusual conditions that may occur. Completeness—to ensure the sampling goal of 100 percent completeness at the end of the season, we will use field reconnaissance to verify that sites have the proper hydrologic conditions. Comparability—all field sampling and analytical procedures will be completed following both previously tested and newly developed SOPs for each metric. They will be performed by the same field crew to the extent possible throughout the sampling season. DWQ's QAPP specifies the minimum QA/QC objectives for sample measurement.
7. Sampling Plan and Design	The baseline sampling program includes the following: Field observations, collection and analysis of water for chemical and physical attributes, as appropriate.

Sampling Design

The objective of this SAP is to assess the condition of storm water before, during and after UIP development through the analysis of chemical data collected from 6 key monitoring locations (Figure 2).

Figure 2. Utah Inland Port Storm Water Monitoring Sites.



Table 3 summarizes the list of sampling sites. Sites are listed in the sequence they will be sampled. DWQ will collect grab samples at the storm water and receiving water sites at least once during June, July, September and October of 2021 and April, May, September and October of 2022 through 2025. Composite storm water samples will be collected from portable samplers during these same months and are contingent on precipitation events of at least 0.1 inch to generate runoff. Qualifying storm events that generate runoff for sample analysis will include those greater than 0.1 inch and at least 4 weeks from the previously measurable—greater than 0.1 inch rainfall—storm event. Samples will be collected throughout the duration of the runoff event and will be integrated into a composite on a flow weighted basis for analysis.

Table 3. Utah Inland Port Monitoring Sites

Site ID	Site Name	Latitude	Longitude
4991426	Lee Creek 0.6 mi north of frontage road and 1.23 mi west of I-80 xing (Downstream of UIP)	40.78019	-112.13924
4991293	North Point Consolidated Canal at T1N, R2W, Sec. 19, SE corner road xing (Downstream of UIP)	40.79833	-112.10128
4991340	Goggin Drain at USGS Gauging Sta No 10172630	40.81678	-112.10151
4991299	Storm Drain Channel at 7200 W and 1300 N	40.79863	-112.06399
4991302	Storm Drain Channel at 6500 W 1100 N	40.79447	-112.0488
4991303	Storm Drain Channel at 6000 W 600 N	40.78396	-112.04408

Measured Parameters

Water quality monitoring activities will aim to understand the temporal and spatial condition of storm water within and leaving the UIP area. They will be characterized by collection and analysis of environmental samples that will help managers understand the temporal and spatial condition of storm water before, during, and after Utah Inland Port development.

Environmental Sample Collection

DWQ's resources will be dedicated to collecting environmental samples that describe the condition of storm water flows and receiving waters. This data will be critical in benchmarking the present condition and identifying changes in water quality associated with the development of the Utah Inland Port project. This section provides a detailed summary of the approach the DWQ will use beginning in 2021.

Sampling Receiving Waters

DWQ will sample each of the three receiving waters downstream of the project area, Lee Creek, North Point Consolidated Canal, and Goggin Drain.

Receiving water sites will be sampled for water chemistry in the summer of 2021 (June and July) and spring (April and May) and fall (September and October) thereafter using grab sample techniques. Composite storm water samples will be collected within these same months during qualifying storm induced runoff events through the use of portable samplers. Water chemistry samples will help determine the temporal and spatial conditions of these waters before, during and after project development.

Table 4 shows the chemical analytes that will be collected at these sites and the estimated budget for analysis costs. Table 5 shows the sampling equipment required to complete this monitoring effort and the estimated budget for acquiring this equipment. Sampling procedures, analytical methods, and quality assurance requirements are found in the QAPP in Appendix F.

Table 4. Parameters to Be Measured and Analysis Budget.

Description	Collection Method	Details	Parameters	Cost per sample*	Total Cost** (144 samples)
General Chemistry	Grab Sample and Portable Sampler Composite Sample	One 500 mL plastic bottle unpreserved	Total suspended solids Volatile suspended solids Total dissolved solids	\$15 \$20 \$15	\$2,160 \$2,880 \$2,160
Total Nutrients	Grab Sample and Portable Sampler Composite Sample	One 500 mL plastic bottle with H ₂ SO ₄ preservative to pH <2	Ammonia Nitrate/Nitrite Total Phosphorus Total Nitrogen	\$38 \$13 \$40 \$53	\$5,472 \$1,872 \$5,760 \$7,632
Total Metals	Grab Sample and Portable Sampler Composite Sample	One 250 mL plastic bottle with HNO ₃ preservative to pH <2	Zinc Lead Cadmium Arsenic Copper Selenium Mercury	\$108 for all	\$15,552
Total Petroleum Hydrocarbons, MBTEXN, DRO (diesel fraction TPH- Dx) and ORO (oil fraction TPH-Ox)	Grab Sample	Three 40 mL vials		\$75	\$10,800
Grand Total of E	Estimated Cost for Ar	nalysis	l	l	\$54,288

^{*} Costs are provided for estimating purposes only and do not necessarily reflect current rates at private analytical laboratories.

Table 5. Portable Sampler Equipment Budget Table.

Description	Quantity	Unit Price	Total Cost
Portable Sampler	6	\$2,974.09	\$ 17,844.54

^{**} Total sample analysis estimate assumes 1 grab sample and 1 composite portable sampler storm water sample collected each month (April, May, September, and October) at all 6 monitoring locations for three years for a total of 144 samples analyzed.

Includes controller, top cover, center section, base, distributor arm, instruction manual, and pocket guide.			
Signature® Area Velocity flow meter system includes base meter, TIENet 350 area velocity sensor with 10m cable, manual, and pocket guide.	6	\$3759.00	\$22,554.00
CDMA LTE cellular modem with magnetic mount antenna for Signature® meter.	6	\$883.87	\$5,303.22
Sample bottles	6	\$202.27	\$ 1,213.62
24-bottle Configuration for 3700 Full Size Portable Sampler. Includes 24 polypropylene 1-liter bottles with caps, bottle retaining ring, and two pump tubes.			
Solar Panel Assembly and 12V Regulator Controller	6	\$345	\$ 2,070.00
Includes PLM50P -50-Watt Solar Panel with 20' lead and PM50U Pole Mount Bracket			
Miscellaneous cables, tubing, strainers, and couplers	6	\$248.90	\$ 1,493.40
Sampler Housing	6	\$1,636.25	\$ 9,817.50
Grand Total			\$ 60,296.28

Project Team and Responsibilities

As defined by DEQ's Quality Management Plan (QMP), any monitoring activity conducted or overseen by DWQ must have a Designated Project Manager (DPM), a staff member who is responsible for a specific project and has immediate managerial or technical control of the project. The DPM is responsible for specifying the quality of the data required for each project and initiating corrective actions when quality control is not being met. The DPM may also be a program manager. The DPM is responsible for designing monitoring strategies, setting project-specific data quality objectives (DQOs), and developing project-specific SAPs. DPMs are responsible for making sure all personnel involved with the project are briefed and/or trained on the procedures to be used.

Any monitoring activity conducted or overseen by DWQ must also have a Field Project Manager (FPM). The FPM will be responsible for checking the field note forms, data collection sheets, field lab sheets/Chain of Custody (COCs) forms for completeness. These sheets will be checked for completeness within 72 hours (or within a week of sample collection). Field notes will be filled out in the field for all sites whether samples were taken. Any information missing from field forms will be verified by the field crew. A list of missing samples or data will be provided to the DPM for data tracking purposes. After the data sheets are reviewed for completeness, all data will be scanned and entered into an electronic worksheet files for storage in the "Utah Inland Port Project\Utah Inland Port Project Management Files\2_Data Management & Monitoring" folder in DWQ's "Storm water" folder on the shared drive, which is backed up daily. When entered into an electronic worksheet, the person who enters the data will double check the information for errors and save the files, so they can be reviewed by the FPM and/or QA Project Manager for quality.

Implementation of the SAP will require an interdisciplinary effort. The team that will implement the SAP consists of various members from UDWQ. Table 6 lists and identifies the key project personnel and their responsibilities. The overall efforts will be coordinated closely with other ongoing research groups and stakeholders.

Table 6. Project Team Members and Contact Information.

Title	Name	Affiliation	Key Tasks or Responsibilities	Contact Info	ormation
			Responsibilities	E-mail	Phone
Designated Project Manager	Carl Adams	DWQ	Oversees direction of project, data analysis, reporting	carladams@utah.gov	w: 801-536-4330
Field Project Manager	Alex Anderson	DWQ	Directs day-to-day work of project, performs field data collection	aranderson@utah.gov	435 760 4286
Quality Assurance (QA) Project Manager	Toby Hooker	DWQ	Oversees QA for Division, responds to QA issues, supervises monitoring team	tobyhooker@utah.gov	w: 801-536-4289

Field Activities

Field operations will be overseen by Alex Anderson, an experienced member of the DWQ Monitoring Section.

Field/Lab Sheets and Chain Of Custody Forms

Preprinted field note sheets, associated lab sheets, Chain of Custody forms, and the Portable Sampler Field Form (Appendix A, Appendix B, Appendix C and Appendix E respectively) will be used on the monitoring run. Field measurements will be recorded in the field sheets and used to correct drift of the deployed data sondes that are programmed to record continuously. Hard copies of field notes are kept in a binder at UDWQ.

All field and lab data and paperwork will include a unique Trip ID: IPP (YYMMDD) or IPP 200314, which reflects a sample trip that began on March 14th, 2020. The Project Code for this study will be 303.

Field Sampling Methods

This section summarizes the methodology for environmental sample collection at the sites and incorporates the DQOs outlined in previous sections, the safety precautions, and workflow.

Field protocols

This section provides a brief overview of the field sampling activities to be performed at each site. Specific instructions, including required equipment and procedures, are located in the SOPs.

SOP for Water Chemistry Samples in Streams

https://documents.deq.utah.gov/water-quality/monitoring-reporting/sop/DWQ-2020-018042.pdf

SOP For Calibration, Maintenance, and Use Of Multiparameter Water Quality Sondes

https://documents.deg.utah.gov/water-quality/monitoring-reporting/sop/DWQ-2020-013606.pdf

SOP For Portable Samplers

https://documents.deg.utah.gov/water-quality/monitoring-reporting/sop/DWQ-2020-008444.pdf

SOP For Chain of Custody Samples

https://documents.deg.utah.gov/water-quality/monitoring-reporting/sop/DWQ-2019-001920.pdf

Health and Safety

Safety must be a primary concern at all times and in all sampling situations for field sampling personnel. In any marginal or questionable situation, monitoring personnel (monitors) are required to assume worst case conditions and use safety precautions and equipment appropriate to that situation. Monitors who encounter conditions which in their best professional judgment may exceed the protection of their safety equipment or may in any way represent a potential hazard to human health and safety, should immediately leave the area and contact their supervisor.

There must be a minimum of two sampling personnel present in the field. To avoid direct contact with contaminated water, latex or rubber gloves will be worn when sampling surface water. Monitors will wash hands and arms thoroughly with bacterial soap after sampling or before eating and drinking. Monitors should be familiar with basic first aid and cardiopulmonary resuscitation (CPR).

Monitors are strongly encouraged to carry a cell phone. Monitors will inform a supervisor when they leave for the field and their estimated time of return. The supervisor will initiate an emergency action plan if the samplers have not returned to the office within the allocated time. To avoid unnecessary worry and concern, samplers will call the office if they are behind schedule.

Safety Precautions and Plan

Field personnel will take appropriate precautions when operating watercraft and working on, in, or around water; possibly steep or unconsolidated banks; or edges of ponds. All field crews will follow appropriate safety procedures and be equipped with safety equipment such as proper wading gear, gloves, first aid kits, cellular

phone, etc. All boats should be equipped with safety equipment such as personal floatation devices, oars, air horn, etc. Utah's Boating Laws and Rules shall be followed by all field personnel.

Field personnel will be aware that hazardous conditions potentially exist at every water body. If unfavorable conditions are present at the time of sampling, it is recommended for staff to reschedule the sample visit. If hazardous weather conditions arise during sampling, such as lightning or high winds, personnel should cease sampling and move to a safe location.

Most often, sample bottles are prepared by the State Lab and already contain preservative. During packing and handling of bottles, the field personnel must be careful and should confirm that caps are tightly sealed in order to avoid contact with preservative (acid). If minor skin contact occurs, field personnel should rinse with copious amounts of water. If major skin or internal contact occurs, affected personnel should seek medical attention.

Monitors should take care to reduce the possibility to contracting diseases carried by insect vectors such as West Nile virus (mosquitoes) and tularemia (horse flies). Other factors to consider are dehydration, weather exposure, stings, and potential site access issues such as barbed-wire fences, broken glass, steep slopes, and mud.

Equipment

Equipment Testing, Inspection, and Maintenance

DWQ field monitors will inspect all sampling equipment before every sampling event. Equipment maintenance will be scheduled and completed based on these inspections and review of the collected data. The QA Project Manager will regularly review all calibration and maintenance records, so the minimum required maintenance occurs. Detailed procedures for the maintenance of equipment are provided in the corresponding SOPs.

The designated laboratories for this project will be responsible for and expected to follow their standard procedures for preventative/unscheduled maintenance, calibration, and correction action for all laboratory instruments. DWQ is not responsible for the maintenance of the designated laboratories' equipment.

Equipment Calibration and Frequency

Each instrument will be calibrated according to in-house and manufacturer recommendations and at the frequency recommended by the manufacturer. However, water quality probes will also be calibrated before each sampling event and in the field if any errors occur while sampling. Calibration procedures will be documented on a calibration sheet (see Appendix D), which includes the location, date, and time of calibration, initials of the person performing the calibration, reference standard used (if applicable), readings taken and adjustments to attain a proper reading, and any corrective action. Records of calibration sheets will be stored electronically and backed up daily; hardcopies will be filed in the project binder in the Field Project Manager's office.

Table 7. Sample Quality Control.

Parameter	QC Check	Frequency	Acceptable Range	Correction Actions
Field Duplicates	Repeatability of sample collection and analysis, and measure of sample heterogeneity	1/10 sites	Relative percent difference of ± 20%	Notify staff if missing; audit and train; decide to allow or reject data
Equipment Blank	Cross contamination between samples	1/ 10 sites or at end of sampling day	Non-detect	Notify staff, repeat procedure, find contamination source, decide to accept or reject data
Dissolved Oxygen (DO)	Written record of calibration	Daily before use	Instrument specific	Verify altitude; if not correct return meter to manufacturer for repair
рН	2 point meter check calibration; written record of calibration	Daily before use	± 5%	Repeat field check; if incorrect return meter for repair
Temperature	Annual calibration against NIST thermometer	Annually	On the calibration mark	Repeat measurement with different thermometer; if not correct return meter to manufacturer for repair
Specific Conductance	1-point calibration and 1-point check; Written record of calibration	Daily before use	± 5%	Repeat field check; if incorrect return meter for repair

Laboratories and Sample Handling Procedures

Laboratories

A variety of sample types will be collected during this study, requiring multiple analyzing laboratories.

Water chemistry samples will be analyzed by the Chemical and Environmental Services Bureau of the State of Utah's Public Health Laboratories (hereafter referred to as the State Lab). The State Lab maintains an in-house QAPP, available from the QAO (Toby Hooker).

DWQ will use American West Analytical Laboratories (AWAL) for analysis of MBTEXN, the Diesel Range Organics (DRO), and the Oil Range Organics (ORO) of total petroleum hydrocarbons. Table 8 summarizes the laboratories, the analyses conducted, and their points of contact for this study.

Table 8. Analysis and Laboratories.

Analysis	Laboratory	Contact	Phone
Water Chemistry (and metals)	UPHL	David Dick	801-965-2405
Total Petroleum Hydrocarbons (MBTEXN, DRO and ORO)	AWAL	Pat Noteboom	801-263-8686
Field Readings (Hydrolab Reading)	On site	Alex Anderson	435-760-4286

Sample Handling

It is the responsibility of the field crew to coordinate with laboratory staff to obtain their own sample bottles at least one week in advance. Samples should not be shipped or delivered to the labs unless they have been informed two days in advance. Water chemistry samples will be stored in coolers in the field or in refrigerators at the TSC when not in the field. After sample collection and compilation, it is the responsibility of the field crew to turn in samples to the appropriate laboratories for analysis.

American West Analytical Laboratories requires a Chain of Custody form to be filled out after sample collection (Appendix C). Sample bottles used in this study need to be handled with care in order to protect the integrity of the sample. All bottles and paperwork shall be reviewed for discrepancies and corrected before leaving samples in the laboratory's custody.

UDWQ's laboratory coordinator, Toby Hooker, works directly with UPHL Sample Receiving and analytical staff regarding water samples and sample data submitted by DWQ. Ryan Parker is the database manager and will coordinate data management practices and storage. All data results from the laboratory will be reviewed and stored by the database manager. This includes chemistry data master logs, electronic lab sheets (from submitted samples), and analysis reports. Data from water samples take approximately 4-6 weeks from submittal to reporting.

Data Management

Data Review and Validation

UDWQ's Designated and/or Field Project Manager will be responsible for receiving the lab and field data sheets, checking for omissions in identification, decimal placement, dates, times, units reported, and comments. Water quality technical staff collecting data will be contacted immediately if there are data gaps or if scheduled sampling times were missed.

It is the water quality technical staff's responsibility to evaluate raw data generated by the contract laboratories for appropriate data summary, data quality, and accuracy. All data will be reviewed and reported in units specified at the detection level of the analysis methods used. To reduce data point loss, data that is reported as "less than" detection level will be considered in subsequent analyses by the Designated Project Manager at a value of 1/2 the detection level. Once data is generated, it will be compiled in a database file. During this data transfer, the information will be reviewed and verified in accordance with data quality objectives.

Data generated in the laboratory will be validated by performance checks such as duplicates and blanks. Data will be reported in the units that have been designated to each parameter in the Analytical Methods, Holding Times, Parameters, and Sample Collection Methods section tables. Scientific notation will be used, and significant figures will correlate with detection levels.

Data Management and Analysis

UDWQ staff proficient in water quality monitoring will organize and all lab reports and field data. DWQ Project Manager will be responsible for analyzing the data and prepare as necessary, annual reports. The findings of the annual report will be utilized to determine if the goals and objectives of the monitoring program are being met and what, if any, modifications to the sampling analysis plan are necessary.

Quality Control

QA/QC samples will be collected as part of UDWQ's monitoring run. It will consist of an Equipment Blank, Trip Blank and a replicate sample. A Trip Blank will only be collected when a VOC and/or an SVOC sample is collected at the beginning of the run by filling deionized water in the appropriate bottles.

The equipment blank for the portable samplers will be collected once per sample retrieval trip in the field to ensure no contamination from the equipment between samples. The equipment blank will have an assigned MLID 4991307 EQUIPMENT BLANK-Inland Port Stormwater Monitoring and will be treated identically to the samples collected in the field.

References

- 1. DWQ. 2014. A Great Salt Lake Water Quality Strategy. State of Utah, Department of Environmental Quality, Division of Water Quality (https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/gsl-wq-strategy/DWQ-2019-000535.pdf)
- 2. EPA. 2006a. *Guidance on Systematic Planning Using the Data Quality Objectives Process.* EPA QA/G-4, EPA/240/B-06/001, U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

Appendices

Appendix A: Field Form

				Mor	nitoring R	un Sample	Summary					
Trip ID :				Samplers:								e that some
Sampler	Contact In	formation (n	ame and phone nun	nber):							bottles co	ome in sets
T : 0												
Trip Con	nments:											
Cog #	Drainet/	Manitarina	Station Dose	Data	Timo	W Tomp	nll	SnC	DO	DO	Flow	Fotim or
Seq. #	Project/ Cost Code	Monitoring Location	Station Desc.	<u>Date</u>	<u>Time</u>	W Temp units:	<u>pH</u>	<u>SpC</u>	<u>DO</u>	<u>DO</u>	Flow	Estim. or
1						°C		uS/cm	mg/L	% sat	CFS	∕leas. (E or M
2												
3												
4												
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Appendix B: Lab Sheet

	Utah Divis	ion of Wa	ter Quality													
	Monitorin	g Run											Sequence	e Number		
	Trip ID	J												Agency		
	Collector												Pro	ject Code		
Sampler (ontact Info	rmation (name and	nhone nur	her).											
Sampler	ontact mic	ination (name and p	Jione nan	iber).											
Monitorin	g Location	ID:					1234571		Time:							
Description	n.								Date:							
Description) i i.								Date.		/IM - DD - \	ſΥ				
Field Spec	cific Condu	ctance (µS	5/cm):							Sample Ty	ре					
								TEST RE	QUESTS:							
Chlorophy	yll-a				Temp:]	pH:]	Comment	is:				
	C'I NI I															
FIELD CON	Site Notes			Weather C	`onditions											
I ILLE OOI	VIIVIEIVIO.			Field Conc												
Sheen nre	esent?: 🗆 \	/ □ N				r sampling	site2 □ V	Пи		Algal mat	at site? □	VΠN				
			ing site 2 🗆		Trasirrica	Jamping	Site. — T		in or other				V \square N			
			ing site? □						in or other	precip. in	ne past 48	nours: 🗆	Y LI IN			
			resent at si			mple resul	ts? ∐ Y ∟	l N								
	uction; car-bo ny above, e		ream bank; s	wimming, e	tc.)											
ii yeste u	ny above, e	жрішіттіс														
Were all I	ab samples	collected	l at this site	as indicate	ed on lab	sheet? 🗆 Y	′□ N									
			not collecte													
			llected at si		l N											
If no, which	ones were	NOT collect	ed and why:				1									
14/			H-1 110.5													
vvere any	pnotos tak	en at site	this visit? [\bot Y \sqcup N												

Appendix C: Chain of Custody Forms

American West Analytical Laboratories 3440 S. 700 W. Salt Lake City, UT 84119 Phone # (801) 263-8686 Toll Free # (888) 263-8686					An army so will be considered using ALEAT accounted interest and an interest using ATTAL standard army to its and reporting										AWAL Lab Sample Set # Page of		
	263-8687 Email awal®				_	OCL	evel:		$\overline{}$		Turr	Aro	und T	ime:		Unless other arrangements have been made, signed	Due Date:
				l			+ 3			ı			5 S			reports will be emailed by	
w	ww.awal-labs.cor	n		느	1 .	2 24	+ 3	3+		<u> </u>	1 2	3 4	5 5	tna		5:00 pm on the day they are due.	
Client:																☐ Report down to the MDL ☐ Include EDD:	Laboratory Use Only
Address:				П											l	☐ Lab Filter for:	COC Tape Was:
City, State, Zip:				П											l	☐ Field Filtered For:	Present on Outer Package Y N NA
Contact:				П											l		2 Unbroken on Outer Package
Phone #:	Cell #:			П											l	For Compliance With:	Y N NA
E-mail:				П											l	□ RCRA	3 Present on Sample Y N
Project Name:				П											l	□ CWA □ SDWA	
					l										l	□ ELAP / A2LA □ NLLAP	4 Unbroken on Sample Y N NA
Project #: PO #:					l										l	☐ Non-Compliance ☐ Other:	
				iners	trix										l		Samples Were: 1 Shipped or hand delivered
Sampler Name:				Contai	e Ma										l	Known Hazards	
Sample ID:		Date Sampled	Time Sampled	T of C	Sample Matrix										l	& Sample Comments	2 Ambient or Chilled 3 Temperature °C
Sumple 157		oumpieu	oumpieu	~		\dashv		Н		Н	\vdash	Н	Н	Н	Н	Sample Comments	3 Temperature °C 4 Received Intact
				Н	\dashv	\dashv	-	Н	\vdash	\vdash	\vdash	Н	Н	\vdash	\vdash		Received Intact Y N
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				Ш	Ц			Ш	Щ	<u> </u>	$ldsymbol{ldsymbol{ldsymbol{eta}}}$	\vdash	Щ	$ldsymbol{ldsymbol{ldsymbol{eta}}}$	<u> </u>		Sample Labels and COC Record Match?
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Relinquished by: Sionalure		Date:	Received by: Signature										Date:			Special Instructions:	
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Print Name: Relinquished by: Sionature		Date:	Received by:										Date:				
Signature Print Name:		Time:	Signature Print Name:										Time:		\neg		

By signing this Chain of Custody you are agreeing to permit AWAL to subcontract any analyses not normally performed at AWAL.

Utah Public Health Chamical and Environmental Laboratory	CHAIN OF CUSTODY	□ RUSH SAMPLES AUTHORIZED BY
Chemical and Environmental Laboratory 4431 S 2700 W Taylorsville, UT 84129-8600		O State Drinking Water Compliance Samples O Private Investigative Samples
801 965 2400 Fax 801 969 3238 http://health.utah.gov/lab/chemistry System/Agency Name Please fill out this form using block letters and with Do not attach this form to the sample. Customer Numb	rr Public Water System Cost/Project Code Sample Matrix ○ Drinking Water ○ Other Water	Date and Time Stamp Sample Receipt Conditions
First Name REPORTING/CONTACT Last Name Address City Phone Fax First Name BILLING SAME AS REPORTING Last Name	Email State Zip New Information Update Account	Documentation complete O Yes O No Proper containers and in-date O Yes O No Containers intact O Yes O No Within holding time O Yes O No Coolant O Yes O No Temperature within-range O Yes O No O N/A Acceptable pt1
Address City Phone Fax	State Zip Submitted By Collector's Initials Bottle Oty Temperature pH	O Yes O No O N/A Acceptable mrem O Yes O No O N/A O Hand Delivered O Shipped Samples
81 Site Description Site Description - Continued 82 Site Description	Collection Date Collection Time Collector's Initials Collection Time Bottle Orv Temperature pH Collector's Initials Bottle Orv Temperature pH	LAB NUMBER
Site Description - Continued #3 Site Description	Collection Date Collection Time Description Date Collection Time Description Date Collector's Initials Bottle Oty Temperature pH	LAB NUMBER
Site Description - Continued #4 Site Description	Collection Date Collection Time Description Date Collection Time Description Date Collector's Initials Bottle Orv Temperature pH	LAB NUMBER
Site Description - Continued	Collection Date Collection Time	LAB NUMBER
#5 Site Description Site Description - Continued	Collection Date Collection Date Collection Time Description Time Collection Date Collection Time Collection Date Collection Time	LAB NUMBER
Dispatched By: Relinquished By: Date Time Date Time Date Time Time	Courier Company Name: Invoice/Air bill #: Received by: Date Time Received at USL:PH by: Date Time	

Appendix D: Multi-Parameter Probe Calibration Sheet

Updated: 11/26/2019



DWQ Multi-Parameter Probe Calibration Report

Rull (Trip ID).			_		Analyst					
Date			_	Instrument	t Make & Model:			-		
				Instru	ment ID Number:					
	041.15	DATION	Specific	Conductance (SpC)						
	CALIB	RATION			QA	/QC		T. 4	114.1	
SpC Calibration Standard Solution Value:		SpC Calibration Standard Solution Expiration Date:		SpC Reference Solution Value:	SpC Reference Solution Expiratio Date:		SpC Measured Value:		Measured Value ±10% of Reference Solution Value?	
								□ Y	es	
									o ¹	
				pH						
	CALIB	RATION		ļ	QA	/QC				
pH Calibration Solution 1 Value ² :	pH Calibration Solution 1 Expiration Date:	pH Calibration Solution 2 Value ² :	pH Calibration Solution 2 Expiration Date:	pH Reference Solution Value:	pH Reference Solution Expiratio Date:	eference pH Measure		'alue: Referenc Solution Val		
								□ Ye		
									01	
	Dissolved	Oxygen (DO)			Equipme	nt QA/Q	С		,	
	CALIBRATION	,,,,	QA/QC			1				
Barometric Pressure (BP) Used to Calibrate DO?	Calibration Value (%):	Displayed Value (%):	Displayed Value ±5% of Calibration Value?	Instrument Date:	Instrument Time:		ument Date me Correct?	Does Ins Battery Adeq Chai	quate	
Probe auto-	100.0		☐ Yes ☐ No¹		,		Yes	□ Ye		
accounts for BP			□ No				No	□ N	0	
			Gene	ral Comments:						
		v								
			Calib	ration Checks						
				on for Calibration Chec	k?	alibration Value	Measured Value ³	Measure Within R Calibratio (i.e., SpC	tange of n Value? C, pH, or	
*	□ SpC □	pH 🗆 DO						□Yes	□No	
	□ SpC □	pH 🗆 DO						□Yes	□No	
	□ SpC □							□Yes	□No	
		pH 🗆 DO						□Yes	□No	
	□ SpC □	pH 🗆 DO						□Yes	□No	
	□ SpC □	pH 🗆 DO						□Yes	□No	
	□ SpC □							□Yes	□No	
		pH 🗆 DO						□Yes	□No	
		pH 🗆 DO						□Yes	□No	
	□ SpC □	pH 🗆 DO						☐ Yes	□No	

¹ If no, use a different probe or perform maintenance

² When using a Hydrolab brand probe, be sure to correct for temperature when calibrating pH (see chart on back)

³ If measured value is not within acceptable range of calibration value, perform a recalibration using a new calibration sheet

Appendix E: Portable Sampler Field Form

Utah DWQ, April 2020

Utah DWQ Portable Sampler Installation, Inspection and Maintenance Form

Site iva	me:						STORET:		
Latitud							Longitud	de:	
Site De	scription:								
Portab	le Sample	r Make/Mod	lel/Serial Nu	ımber <u>:</u>					
Portab	le Sample	r Calibration	Date:				Installation,	Deployment D	ate:
Installa	tion Perso	onnel:							
Notes f	rom Insta	llation:							
							Г	-	
		Visual Inspection	Visual Inspection	Data Retrieval	Battery Life	Memory Remaining	Maintenance	Flow Measurement	
	Monitor	Performed	Okay	Performed	Remaining	Kemaning	Performed	Performed	Equipment Condition, Comments,
Date	Initials	(Y or N)	(Y or N)	(Y or N)			(Y or N)	(Y or N)	Describe Maintenance
			, ,				, ,	, ,	
				I	I	I			

Appendix F: Quality Assurance Project Plan

 $\underline{https://documents.deq.utah.gov/water-quality/monitoring-reporting/sop/DWQ-2019-001869.pdf}$

Appendix G: Revisions

9/21/2020

Updated Table 3 by removing monitoring location 4991430, Lee Creek at I-80 Crossing and added MLID 4991426, Lee Creek 0.6 mi north of frontage road and 1.23 mi west of I-80 xing (Downstream of UIP). New site captures runoff from frontage road and is now behind a locked gate and safter location with DWQ access per agreement with Rio Tinto.

1/27/2021

Updated Table 1 by extending for one year as deployment of portable samplers was not completed until fall of 2020 due to logistical challenges.

Changed qualifying storm event frequency from at least 72 hours to 4 weeks from the previously measurable storm event (p. 7) to minimize the influence of previous storm events on sample results.

Updated Table 3 by removing monitoring locations 4991650 (Kersey Creek AB Magna WWTP), 4991297 (West Branch Brighton Canal at T1N, R2W, Sec. 28 NE corner), 4991305 (West Branch Brighton Canal at North Temple Frontage Rd xing), and 4991295 (North Point Consolidated Canal below confluence with West Branch Brighton Canal (Upstream of UIP)) and replaced with 4991340 (Goggin Drain at USGS Gauging Sta No 10172630), 4991299 (Storm Drain Channel at 7200 W and 1300 N), 4991302 (Storm Drain Channel at 6500 W 1100 N), and 4991303 (Storm Drain Channel at 6000 W 600 N). The replacement of upstream sites with downstream sites will more effectively capture both localized (storm drain channels) and area-wide (Lee Cr, North Point Canal, and Googin Drain) water quality trends and more effectively utilize resources.